~~Patent Claims~~ WHAT IS CLAIMED IS

1. A method for fabricating a composite material out of a parent substance containing silicon nitride and metal silicide, through gas pressure sintering in a nitrogenous atmosphere, characterized in that, as metal silicide, Me_5Si_3 is introduced into the parent substance, the partial nitrogen pressure is established as a function of the sintering temperature in such a way that, still stable at the lower limit of the practical range is Si_3N_4 and, at the upper limit, Me_5Si_3.

2. The method as recited in Claim 1, characterized in that the metal in the silicide is selected from a metal of the 5th or 6th subgroup.

3. The method as recited in Claim 2, characterized in that the metal is selected from the group Mo, Nb, V, Nb, Ta and W.

4. The method as recited in one of Claims 1 through 3, characterized in that a weight ratio of between about 20:80 and 80:20 is adjusted for Si_3N_4:Me_5Si_3.

5. The method as recited in one of Claims 1 through 4, characterized in that sinter additives are added to the parent substance.

6. The method as recited in Claim 5, characterized in that aluminum oxide and/or yttrium oxide and/or similarly acting materials are added as sinter additives.

7. The method as recited in Claim 5 or 6, characterized in that the concentration of sinter additives in the initial mixture is retained at < about 10 % by weight.

8. The method as recited in one of Claims 1 through 7, characterized in that pressing and/or binding agents are added to the parent substance.

9. The method as recited in one of Claims 1 through 8, characterized in that the parent substance is ground.

10. The method as recited in one of Claims 1 through 9, characterized in that the parent substance is formed in a desired shape through ceramic injection molding or cold-isostatic pressing, and, if indicated, through subsequent green processing.

11. The method as recited in one of Claims 1 through 10, characterized in that the parent substance is densified cold-isostatically at a pressure of between about 100 and 300 MPa.

12. The method as recited in one of Claims 1 through 11, characterized in that prior to the sintering operation, the parent substance is subjected to a pre-sintering.

13. The method as recited in Claim 12, characterized in that the presintering takes place at a temperature of between about 500 and 700°C.

14. The method as recited in Claim 12 or 13, characterized in that the presintering takes place at a pressure of between about 0.05 and 0.2 MPa.

15. The method as recited in one of the Claims 1 through 14, characterized in that the sintering is carried out between about 1700 and 1900°C.

16. The method as recited in one of the Claims 1 through 15, characterized in that the sintering is carried out at a partial N_2 pressure of between about 0.5 and 1.0 MPa.

17. The method as recited in one of the Claims 2 through 16, characterized in that molybdenum is used as metal, and that, as a function of the temperature, the upper limit of the partial N_2 pressures (p_{N2}) is set in accordance with the equation $y_1 = 5.3071 \cdot \ln(T) - 37.014$ and the lower limit in accordance with the equation $y_2 = 7.3494 \cdot \ln(T) - 54.124$, y_1 and y_2 representing $\lg(p_{N2}\ [bar])$ values.

18. The method as recited in one of the Claims 2 through 15, characterized in that niobium is used as metal, and that, as a function of the temperature, the upper limit of the partial N_2 pressure (p_{N2}) is set in accordance with the equation $y_1 = 7.8968 \cdot \ln(T) - 58.8$ and the lower limit in accordance with the equation $y_2 = 8.2598 \cdot \ln(T) - 62.064$, y_1 and y_2

representing $lg(p_{N2}$ [bar]) values.

19. The method as recited in one of the Claims 1 through 18, characterized in that the sintering is carried out in a gas-pressure sintering furnace.

20. A silicon-containing composite material, whose silicon-containing constituents are made of Si_3N_4 and of a metal silicide, characterized in that the metal silicide is selected from the group Nb_5Si_3, V_5Si_3, Ta_5Si_3 and W_5Si_3.

21. The composite material as recited in Claim 20, characterized in that the metal silicide contains carbon.

22. The composite material as recited in Claim 21, characterized in that the metal silicide contains carbon with a concentration specific to the composite material of about 0.3 to about 0.6 % by weight.

23. The composite material as recited in one of Claims 20 through 22, characterized in that the mass ratio of Si_3N_4:Me_5Si_3 is between about 20:80 and 80:20.

24. The composite material as recited in one of Claims 20 through 23, characterized in that sinter additives are added to the parent substance.

25. The composite material as recited in Claim 24, characterized in that the sinter additives are made of aluminum oxide and/or yttrium oxide and/or similarly acting materials.

26. The composite material as recited in Claim 24 or 25, characterized in that the concentration of sinter additives in the initial mixture is < about 10 % by weight.

27. The composite material as recited in one of Claims 20 through 26, characterized in that the metal silicide is Nb_5Si_3.

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